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ABSTRACT

The purposes of this study were: (1) to determine whether there is a developmental sequence in the child's acquisition of certain metalinguistic abilities; and (2) to determine whether the child's acquisition of these metalinguistic abilities is related to Piagetian operations. The measure of metalinguistic ability on which this study focused was word awareness, or the ability to separate and identify words presented in context. The subjects were 100 children, 50 from a kindergarten and 50 from the first grade of a public school. The children were tested on the Word Awareness Test, three Piagetian seriation tasks, two seriation tasks devised by Almy, a standardized Riddle Interview, a group IQ test, and a reading readiness test (for kindergarten subjects) or reading achievement test (for first grade subjects). Factor analysis and analysis of variance were performed. The findings show a rapid increase in word awareness at about age six, and substantiate the theoretically predicted order of difficulty of the item types (lists, sentences, and homophones). The relationship between the Word Awareness Test and the Piagetian tests of seriation was low. (DB)

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Metalinguistic Ability and Cognitive Performance in Children from Five to Seven

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The purposes of this study were: (1)to determine whether there is a developmental sequence in the child's acquisition of certain metalinguistic abilities; (2)to determine whether the child's acquistion of these metalinguistic abilities is related to Piagetian operations. The measure of metalinguistic ability on which this study focused was word awareness, or the ability to separate and identify words presented in context.

Theoretical writings of Piaget(1923) and Vygotsky(1962) support the view that the child only gradually develops awareness of words as manipulable units. Vygotsky states, "Semantically, the child starts from the whole, from a meaningful complex, and only later begins to master the separate semantic units, the meanings of words, and to divide his formerly undifferentiated thought into units (p. 126)." Werner and Kaplan(1963) contend that, although a child speaks grammatically, there is a fusion of word meaning with sentence meaning, and a lack of true lexical concepts.

Recent experimental studies (e.g., Braun-LaMesch, 1967; Holden and MacGinitie, in press; Huttenlocher, 1964; Karpova, 1955) have shown that children under five do have great difficulty in isolating or manipulating words in context, and that older children continue to have difficulties with such word classes as prepositions, articles, and conjunctions.

Because dramatic changes in the ability to segment language appear to occur between the ages of five and seven, researchers have speculated that there may be a connection between the development of word awareness and the appearance of Piagetian concrete operations. If this is so, operational

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levels may exist with respect to language as well as with respect to cognitive structures. The child who cannot predict or imagine the effect of physical operations upon objects may also lack the ability to isolate and manipulate the elements of language--to decenter from the semantic aspect of the message and focus on its structural or phonetic aspects.

Procedure

In addition to investigating the relationship between metalinguistic ability, as indexed by word awareness, and cognitive development, this study attempted to determine if the emergence of word awareness could be shown to follow a theoretically postulated sequence.

Many earlier word awareness studies have tacitly assumed that young children understand the meaning of the term word. To eliminate possible difficulties from this source, each item in the Word Awareness Test, specifically designed for this study, employed two utterances that were identical except for the addition of a word or short phrase in the second utterance. The child's task was to identify the addition to the second utterance.

Three types of items were constructed based on the assumption that word awareness proceeds according to predictable principles. If young children perceive utterances globally, a logical first step in recognizing the segments of language might occur in situations where words were presented in an unstructured list. Thus, an easy item should be read, boy, blue; read, boy, many, blue, where the child has only to identify the inserted word many to achieve success. The addition of words to sentences that

already form a semantic whole should result in a more difficult type of item: Jack went swimming; Jack and Bill went swimming. The most difficult condition was assumed to occur in a situation where the addition of a word drastically changed the grammatical structure of the sentence. Items with these characteristics were constructed around homophone pairs. A typical item would be John leaves after dinner; John raked leaves after dinner. The Word Awareness Test consisted of 30 items similar to the examples given above divided into three subtests: Test I, Lists; Test II, Sentences; and Test III, Homophones. Each subtest contained 10 items.

The subjects were 100 children, 50 from the kindergarten and 50 from the first grade of a suburban public school in northern Virginia. The children were tested on the Word Awareness Test, three Piagetian seriation tasks (simple seriation, seriation with screen, and intercalation; Inhelder and Piaget, 1964), two seriation tasks devised by Almy(1970), a standardized Riddle Interview, a group IQ test (the CAT) and a reading readiness test (for kindergarten Ss) or a reading achievement test (for first grade Ss).

The seriation tasks were selected because they involve aspects of serial ordering that are analagous to metalinguistic operations. However, in speech as in seriation, the relationship of the units to each other may not be available to the pre-operational child.

Scores on 29 variables for the first grade and 35 for the kindergarten (including subtests of each instrument) were used to derive three correlation matrices, one for each grade and one for the total sample. The correlation matrix for the entire sample was edited, and total scores and scores that were not comparable for both grades were deleted. The edited matrix was submitted to a principle components factor analysis with verimax rotation.

Analysis of variance was performed to determine if there were significant differences between grade levels and between the three types of word awareness items.

Results

The reliability of the Word Awareness Test as calculated by the analysis of variance method was .93 for kindergarten and .87 for first grade. There were significant differences at the .01 level between grade levels, types of word awareness items, and for the interaction between them. The items in Test I, Lists, were easier than the items in Test II, Sentences, which in turn were easier than the items in Test III, Homophones.

An analysis of variance of scores on the Piagetian seriation tests revealed that the entire battery of three tasks had a reliability, for the entire sample, of .54. Test-retest reliabilities obtained on a similar sample yielded correlations of .56 for seriation with screen and .74 for intercalation, suggesting that seriation with screen is a rather unstable measure, and intercalation only a moderately stable one. Under these conditions, very high correlations with the Word Awareness Tests were precluded.

The factor analysis revealed six major factors. The word Awareness subtests clearly loaded on Factor 1 as did chronological age. Factor 2 was dominated by the subtests of the group intelligence test. Factor 3 represented Piaget's intercalation task and Almy's(1970) seriation tests. Factor 4 received heavy loadings from parental education, and the Riddle Interview loaded heavily on Factor 5. The last Factor was uninterpretable. None of the variables of the study loaded heavily on more than one factor, and no factor received heavy loadings from more than one group of variables,

with the notable exception of age and word awareness. However, in this sample age is related to exposure to reading instruction, and the inference that age is a major variable in determining word awareness should be made with this reservation.

Qualitative analysis of the data suggested that identification of the inserted word or phrase is influenced by the abstract-concrete dimension of the inserted word(s), the transformational complexity of the sentence into which it is inserted and the length of that sentence. Thus, concrete words inserted at the beginning of short simple sentences or lists appeared to present the least difficulty. Abstract words inserted into longer more complex sentences in medial positions were much more difficult.

The relationship between the Word Awareness Test and the Piagetian tests of seriation was low. The simple seriation task was easy for this sample, and the scores were unreliable. The remaining seriation test scores--seriation with screen, intercalation, and total seriation--and the three Word Awareness Test scores plus total score for Word Awareness yielded a total of 36 correlation coefficients, 12 for kindergarten, 12 for the first grade and 12 for the total sample. All were positive; 23 were significant at the .05 level, and 15 were significant at the .01 level. The highest correlation, however, was only .48.

Discussion

The findings show a rapid increase in word awareness at about age six. and substantiate the theoretically predicted order of difficulty of the item types. Short term memory is not likely to be an explanation of these findings. Four of the sentences in Test II, Lists, were jumbled versions of four sentences in Test III, Homophones. The kindergarten Ss performed better on the four items when they were presented under the list condition, whereas the first

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grade Ss, although outperforming the kindergarten Ss on all eight items, performed better on two items under the list condition and two under the sentence condition. These results accord with a model that predicts that development is towards a state in which syntax can be utilized to illuminate structural flexibility, rather than imposing semantic rigidity.

The findings are similar to Sinclair's(1967) in one respect. In both studies, when the data are dichotomized and entered into a 2 x 2 contingency table, there are very few children who achieve the level of concrete operations who do not also reach an advanced level on the linguistic task, but there are a number of linguistically advanced children who are not operational. Although Sinclair did not interpret her results as demonstrating the priority of language over operations, the problem of explaining these results in terms of the Piagetian model remains. In addition, the lack of word awareness in young children is inconsistent with models of language acquisition that postulate an innate ability to store lexical items and perform operations upon them.

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